




Broadcast Equipment



Instructions

Automatic
Sleet Melter
Control Unit

MI-27369



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EQUIPMENT

Equipment Supplied:

Automatic sleet melter control unit with six-foot four-conductor power and control cable.

Equipment Not Supplied:

Junction box for connections at tower top.

Line contactor for heaters.

Control relay, where necessary.

TECHNICAL SUMMARY

Power Line Requirements	-----	110 volts, 60 cycles
Current Rating of Relay Contacts	-----	10 amperes
Automatic Temperature Limits		
Upper Limit	-----	32 or 40 degrees F
Lower Limit	-----	10 or 20 degrees F or Stay On
Dimensions		
Height	-----	4-1/2 inches
Width	-----	6-1/2 inches
Depth	-----	3 inches
Weight	-----	5 pounds (approx.)

DESCRIPTION

The RCA MI-27369 Automatic Sleet Melter Control Unit has been designed to automatically operate the control circuits for antenna heater elements as ambient weather conditions make necessary. Installation of a weather monitoring unit of this type precludes the possibility of heater operation when temperatures are not within the ice forming range.

The unit is sturdily constructed and enclosed in a weather-tight cast-aluminum box. This type design makes possible the mounting of the unit at the top of the tower, or preferably at the midpoint of the antenna pole on the larger antennas. For a TF-12AL or TF-12AM antenna it is recommended that one control unit be used at the tower top and another control unit be used halfway up the antenna. The unit at the tower top may then be used to control the lower six sections and the other unit may be used to control the heaters for the remaining sections. Considerable temperature variations often exist between the antenna location at the top of the tower and the ground level, so that ice may be forming on the antenna while the temperature on the ground remains above freezing.

Extensive research with the United States Weather Bureau has indicated that precipitation and resultant ice formation usually occurs only between the temperatures of 10 and 35 degrees F. An exception is rime ice which may form at any temperature below 35 degrees F, but is restricted to certain sections of the United States. The MI-27369 Sleet Melter Control Unit has therefore been designed with adjustable temperature ranges so that it can cut off above and below the temperatures chosen to conserve power and extend heater life.

The upper temperature limit may be set at 32 or 40 degrees F; and the lower temperature limit may be set at 10 or 20 degrees F. Whichever upper temperature limit is chosen, the sleet melters will automatically be energized when the temperature falls below that limit and automatically de-energized when the temperature rises above that limit. Depending upon the lower limit chosen, the sleet melters will be de-energized when the temperature falls below this limit and re-energized when the temperature exceeds this limit.

For specific locations subject to rime ice formations, the lower limit includes a "stay-on" position to allow for continuous operation of the heaters for all temperatures below 32 or 40 degrees F.

CIRCUIT OPERATION

For the operation of the Automatic Sleet Melter Control Unit, refer to the schematic diagram, Figure 1. Assume that the upper limit chosen is 40 degrees, and the lower limit is set at 10 degrees.

Power is applied to the unit on the black and the white wires of the cable. This applies power to the red lead which may be used to energize an indicator light which will be lit whenever power is applied to the unit.

When the temperature is above 40 degrees, current will flow into the unit on the white wire, up through the mercury column to the +40 mark and then through the lower relay coil to the black wire. This pulls the relay contact up causing the upper relay coil circuit to be open.

If the temperature drops below 40 degrees, the mercury column will descend, opening the coil circuit of the lower relay. The contact will move down and permit current to flow from the white wire through the mercury column to the +10 mark, and then through the upper relay coil circuit to the black wire.

With the upper relay energized, power from the black wire is then applied to the green wire (contactor control circuit) through the contacts of both relays. Power is thus applied to the heaters and ice formations are prevented.

If the temperature drops below 10 degrees, where the hazard of antenna icing no longer exists, the mercury column will fall below the +10 mark, de-energizing the upper relay so that power is no longer applied to the heater contactor control circuit. The heater circuit will remain open until the mercury re-enters the ice-forming zone of the thermometer.

For operation in rime ice areas, the POWER OFF SELECTOR may be connected to the STAY ON terminal so that the control lead for the upper relay coil bypasses the mercury column. In this manner, heater operation is continuous for all temperatures below 40 degrees.

INSTALLATION

Various types of antennas, methods of heater connections, etc. make it impractical to furnish other than general information on a heater control circuit. However, a typical control circuit is shown on Figure 2. It is recommended that a circuit similar to the one shown on Figure 2 be employed since desirable features, such as the circuit breaker in the heater supply lines, are included in a circuit of this type. It is also advisable to engage a licensed electrician to make a survey of the installation and to ascertain that local codes are observed.

For the NEMA size contactor required, consult Table I. The ratings given in this tabulation are based on a-c magnetic contactors. See Table II for contactor coil current requirements.

TABLE I

Antenna Type	Heater Rating (watts)	No. Heaters	Total KW	NEMA Size Contactor			Control Cable* (AWS)
				115-volt Single-Phase	220-volt Two-Phase	220-volt Three-Phase	
TF-3C	750	12	9	3	2	1	14
TF-3D	500	12	6	3	2	1	14
TF-4A	500	16	8	3	2	1	14
TF-5A1	500	20	10	3	3	2	14
TF-6A1	250	24	6	3	2	1	14
TF-6AH	250	24	6	3	2	1	14
TF-6AM/ -6BM	500	24	12	4	3	2	14
TF-6AL	750	24	18	5	3	3	14
TF-12AH/ -12BH	250	28	12	4	3	2	14
TF-12AM	500	48‡	24	4	3	2	14
TF-12AL	750	48‡	36	5	3	3	14

*Control cable for tower height of 1500 feet or less.

‡Two sets of 24 heaters. Use one contactor for each set.

TABLE II

NEMA Size Contactor	Inrush Amperes	Holding Amperes
1	1.5	0.32
2	5.0	0.86
3	10.0	1.6
4	13.0	2.0
5	30.7	3.04

It should be noted that to operate all contactors except the NEMA size 1, a separate control relay, such as the Westinghouse Type N, Class 15-820 or equivalent, should be used to prevent overload of the relay contacts in the Automatic Sleet Melter Control Unit. These contacts are rated at 10 amperes and in order to provide an ample factor of safety during the inrush period, the control relay should be used with the larger contactors.

It is desirable that the contactor used be of the enclosed type even though the intended location is indoors. Additionally, if used outdoors, the enclosure must be weather-proof. To facilitate servicing and routine maintenance it is also suggested that the contactor be located at the ground level.

The actual installation of the control unit should begin by removing the cover and gasket, and setting the POWER ON and POWER OFF selectors to the desired operating range. This is accomplished by loosening the correct selector screws on the terminal board and connecting the loose leads to these terminals. Tighten the screws after connecting the leads. Consulting the local branch of the U.S. Weather Bureau may prove helpful in making this selection. After these adjustments, replace the gasket and cover, and secure with the hardware previously removed.

Now mount the unit either on the antenna pole or at the top of the tower. Provisions have been made for mounting by means of two 5/16-inch bolts spaced 6-7/16 inches apart, or by means of two hose clamps. The bolts or clamps are not furnished. The control unit is furnished with a four-conductor cable six feet long. This cable should be terminated in an appropriate junction box where connections may be made with the main cable running down the tower.

Connect the black and the white wires to the 115-volt a-c supply. The red wire should be used for an indicator lamp (located in control room) which will light whenever power is applied to the Automatic Sleet Melter Control Unit. Connect the green wire to one side of the contactor coil circuit in the case of a NEMA size 1 contactor, or to one side of the control relay if a larger size contactor is used.

Complete and test the entire installation.

To check the operation of the system, remove the cover and gasket from the Automatic Sleet Melter Control Unit, saving these items and the hardware for reassembly. Apply power to the supply circuit. The indicator lamp showing that power is applied to the unit should light.

De-energize the supply circuit. Disconnect the POWER ON SELECTOR lead from the terminal board. Re-apply power to the supply circuit. The light should again light and power should now be applied to the heater contactor. If an indicator lamp has been installed in the contactor circuit as in Figure 2, it should also be illuminated at this time.

Upon completing the foregoing tests, re-connect the POWER ON SELECTOR lead, and replace the cover, gasket, and hardware on the unit. The equipment is now ready for operation.

OPERATION

It is necessary only that the power supply circuits be energized to place the system in operation. Normal or abnormal operation will be apparent by observance of the indicator lamps.

MAINTENANCE

No maintenance on the equipment will be required except for periodically (during semi-annual antenna inspections) checking the mounting hardware and weather-proof cable connector for tightness, and occasionally testing the indicator lamps.

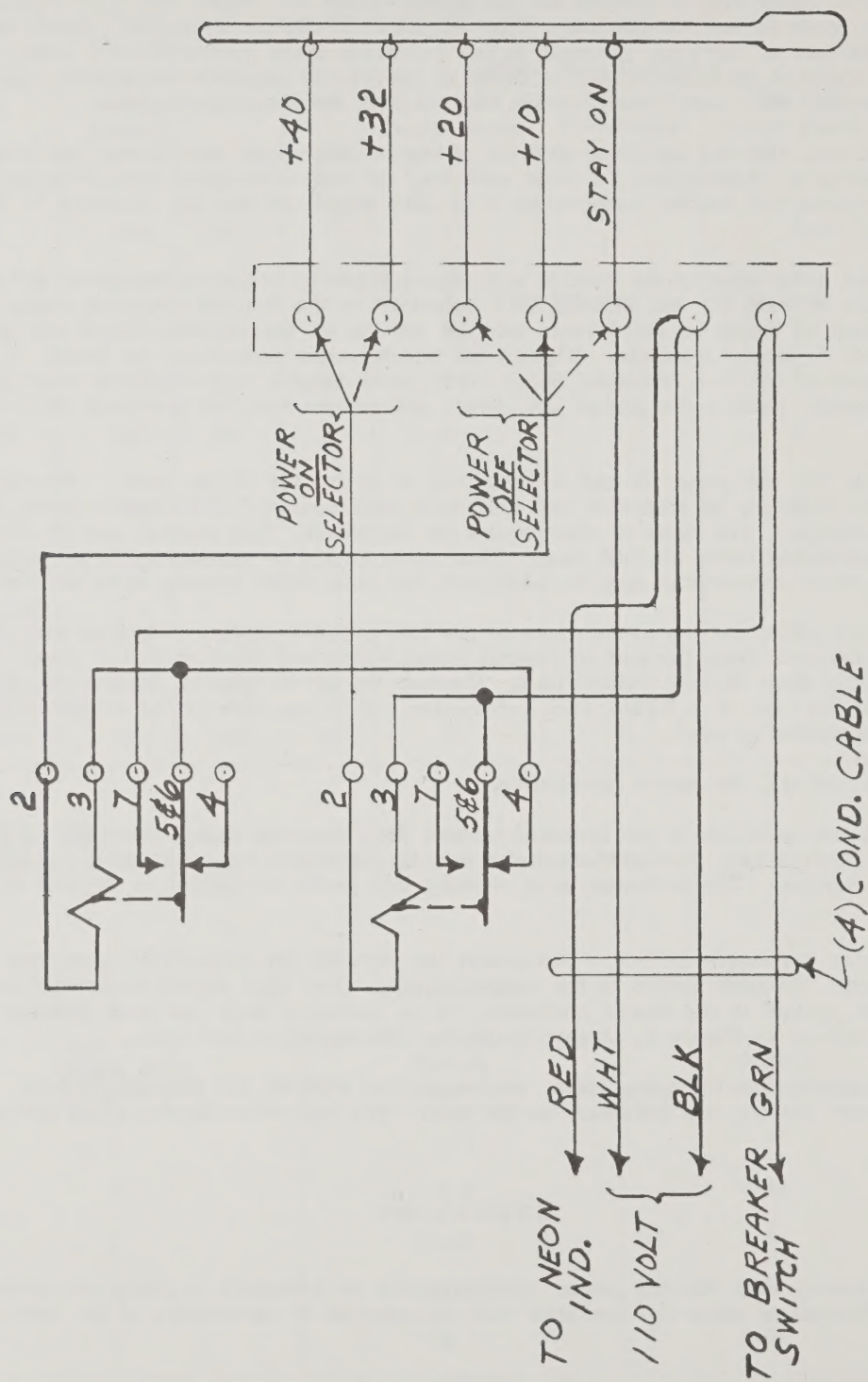


Figure 1. MI-27369 Automatic Sleet Melter Control Unit Schematic Diagram

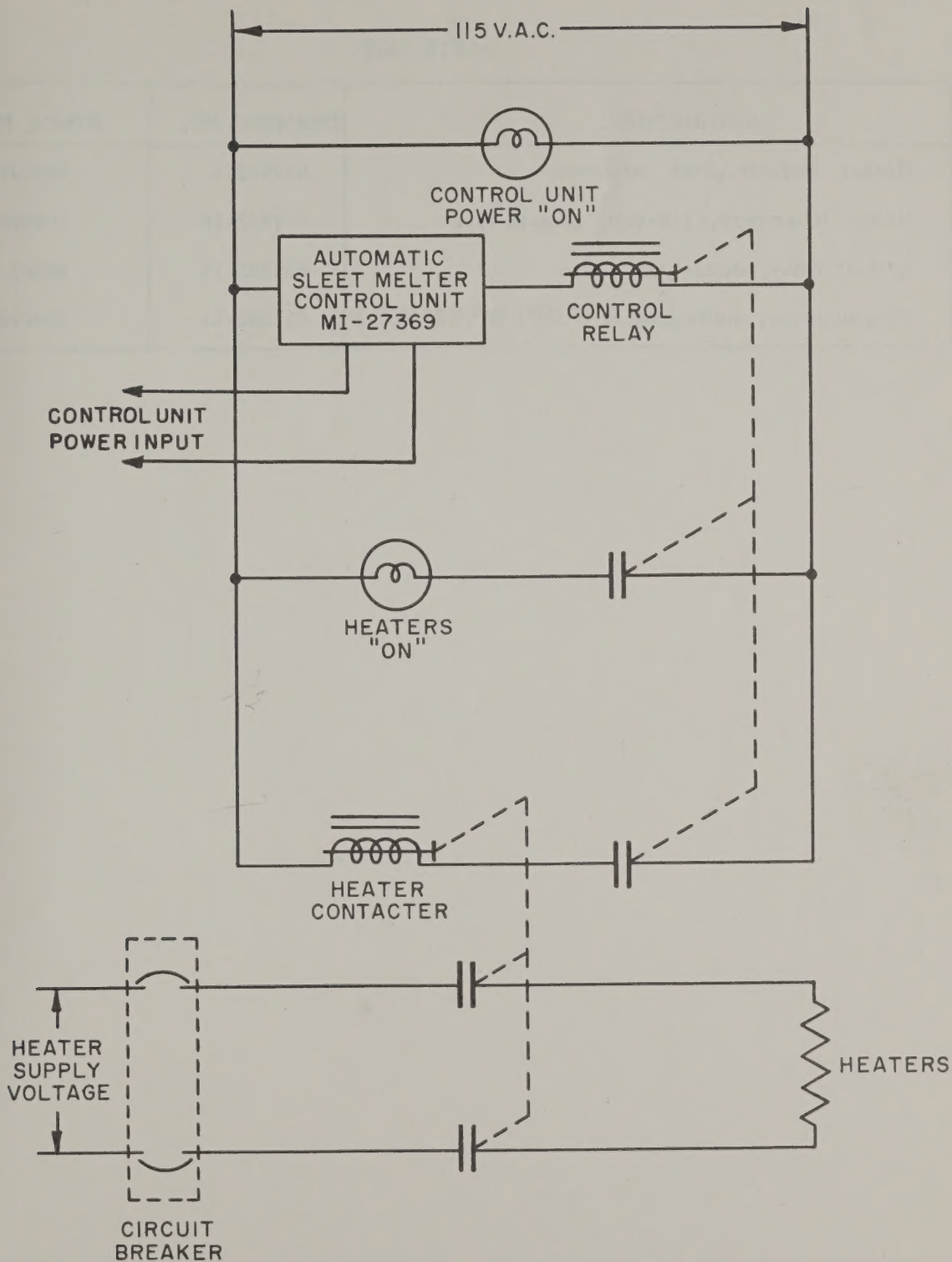


Figure 2. Typical Sleet Melter Control Circuit

PARTS LIST

DESCRIPTION	DRAWING NO.	STOCK NO.
Gasket: weather-proof, neoprene	637932-4	209697
Relay: 10-ampere, 115-volt, plug-in type	637932-16	209699
Socket: relay, octal-type	637932-17	68592
Thermometer: multi-contact 0°/10°/20°/32°/40° F	637932-11	209698

